

REMARKS

Disposition of Claims

Prior to this response, the application included claims 1-18, 33-35, and 37. Claims 19-32 and 36 were previously cancelled. Applicants have amended claims 33-35 and 37 to replace “drop ejector” with --method-- because these claims depend from method claims. Applicants also amended claims 2 and 5 in response to address the Examiner's objections of these claims. Applicants have added dependent claims 38-55. Accordingly, Applicants present claims 1-18, 33-35, and 37-55 for examination with claim 1 in independent form.

Objections

The Examiner objected to claim 2 because she said “forming the meniscus by controlling the pressure at the meniscus” is unclear. To clarify, Applicants have amended claim 2 to recite “forming the meniscus by controlling the pressure in the fluid.”

The Examiner objected to claim 5 because “the vacuum” lacked antecedent basis. Applicants have amended claim 5 to depend from claim 4 rather than claim 3 to provide antecedent basis for “the vacuum.”

Accordingly, Applicants respectfully request that the Examiner withdraw the objections to claims 2 and 5.

Rejections under 35 U.S.C. §103

The Examiner rejected claim 1, 6-14, 16-18, 34, 35, and 37 under 35 U.S.C. 103(a) as obvious over Agarwal et al. (U.S. 6,254,219) in view of Moriyama et al. (U.S. 5,745,129).

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as obvious over Agarwal et al. in view of Moriyama et al. and further in view of Mackay et al. (U.S. 6,139,136). Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as obvious over Agarwal et al. in view of Moriyama et al. and further in view of Wouters (U.S. 6,957,882). Claims 15 and 33 are rejected under 35 U.S.C. 103(a) as obvious over Agarwal et al. in view of Moriyama et al. and further in view of Kazama et al. (U.S. 6,511,156).

Independent Claim 1

The Examiner rejected independent claim 1 under 35 U.S.C. §103 as unpatentable over Agarwal in view of Moriyama. The Examiner acknowledges that Agarwal does not describe a "method of fluid ejection, comprising...the meniscus defining a fluid depth above the edge of the nozzle opening equal to about 1 to 15% of the nozzle opening width," and cites Moriyama as disclosing this feature. The Examiner states that Moriyama et al. disclose an inkjet head having discharge openings (having a diameter of 25 microns), wherein a meniscus has a depth of about 2 microns (less than 15% of the nozzle width). (Office Action, p. 3, item 4). The Examiner argues that one of ordinary skill in the art would have modified Agarwal's invention to include means for maintaining a meniscus depth equal to 1-15% of the nozzle width as allegedly taught by Moriyama for the purpose of controlling ink ejection.

We disagree. Applicants submit that Moriyama fails to describe "the meniscus...above the edge of the nozzle opening equal to about 1 to 15% of the nozzle opening width..." as recited in independent claim 1. (Emphasis added)

Rather, Moriyama describes states: "[t]he meniscus 212 is normally slightly concave, about two microns in depth from the surface of the discharge opening, in a steady state when ink is not being discharged." (Moriyama, Fig. 4; col. 4, lines 6-9). However, the meniscus described in Moriyama is below the surface of the discharge opening, unlike the meniscus in claim 1 that is above the edge of the nozzle opening. (Emphasis added) For example, Applicants show in Fig. 1B the meniscus 52 above the edge 42 of the nozzle opening.

Thus, even if one of skill in the art would have modified Agarwal's printhead to include the feature acknowledged to be missing by the Examiner, that person still would not arrive at the invention recited in independent claim 1. Accordingly, Applicants submit that independent claim 1 is non-obvious and respectfully request that the rejection against claim 1 under 35 U.S.C. §103(a) be withdrawn. Furthermore, because claims 6-14, 16-18, 34, 35, and 37 depend from claim 1, these claims are non-obvious for at least the same reason as claim 1.

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as obvious over Agarwal et al. in view of Moriyama et al. and further in view of Mackay et al. (U.S. 6,139,136). The Examiner

acknowledges that neither Agarwal nor Moriyama disclose "forming the meniscus by controlling the pressure in the fluid," or "forming the meniscus by reducing the pressure in the fluid." The Examiner cites Mackay as disclosing these features.

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as obvious over Agarwal et al. in view of Moriyama et al. and further in view of Wouters (U.S. 6,957,882). The Examiner acknowledges that neither Agarwal nor Moriyama disclose "comprising applying a vacuum at a location upstream of the nozzle opening," or "wherein the vacuum at the nozzle opening is about 0.5 to 10 inwg," and cites Wouters as disclosing these features.

Claims 15 and 33 are rejected under 35 U.S.C. 103(a) as obvious over Agarwal et al. in view of Moriyama et al. and further in view of Kazama et al. (U.S. 6,511,156). The Examiner acknowledges that neither Agarwal nor Moriyama disclose "wherein the fluid is pressurized by a piezoelectric element," and cites Kazama as disclosing this feature.

However, Applicants submit that Mackay, Wouters, and Kazama fail to disclose the feature lacking in Agarwal and Moriyama, specifically, a method of fluid drop ejection, comprising...the meniscus...above the edge of the nozzle opening equal to about 1 to 15% of the nozzle opening width.

Applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. §103(a) of claims 2, 3, 4, 5, 15, and 33.

Conclusion

The fees in the amount of \$150.00 for the excess claim fees are being paid concurrently herewith on the Electronic Filing System (EFS) by way of Deposit Account authorization.

Please apply all charges or credits to Deposit Account No. 06-1050, referencing Attorney Docket No. 09991-147001. It is understood that this perfects the application and no additional papers or filing fees are required.

Respectfully submitted,

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